

Route Math Lab

Use right triangles to find real distances.

GRADE 8 • TEKS 8.7

8.7 "Expressions, equations, and relationships. The student applies mathematical process standards to use geometry to solve problems. The student is expected to: solve problems involving the volume of cylinders, cones, and spheres..."

NAME _____

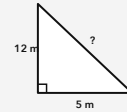
DATE _____

RIGHT-TRIANGLE PLAN

For a right triangle, use $a^2 + b^2 = c^2$, where c is the longest side. To check whether a triangle is right, see whether the squares of the two shorter sides add to the square of the longest side.

WORKED EXAMPLE

A museum installs a diagonal cable across the right-triangle banner shown. How long is the cable?



1. The 5 m and 12 m sides are the legs.
2. $c^2 = 5^2 + 12^2 = 25 + 144 = 169$.
3. $c = 13$ m.

Answer: 13 m

PRACTICE 4 problems

- 1** A stage crew uses a 7 ft ground brace and a 24 ft upright support. Find the brace length needed to reach the top.

ANSWER _____

- 2** Three drone landing pads are 9 m, 40 m, and 41 m apart. Do the pads form a right triangle? Show a square check.

ANSWER _____

- 3** A theater backdrop has side lengths of 10 yd, 24 yd, and 26 yd. Is the backdrop a right triangle? Show a square check.

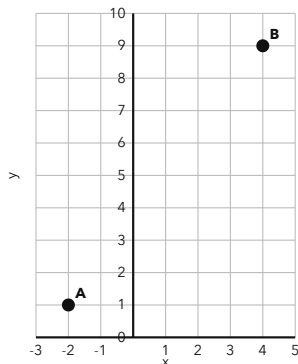
ANSWER _____

- 4** A bike designer makes a triangular frame with perpendicular sides of 11 cm and 60 cm. Find the straight support length.

ANSWER _____

APPLY IT Show your work

- 1** On the game map, your avatar moves straight from A to B. How far is the move, in map units?



ANSWER _____

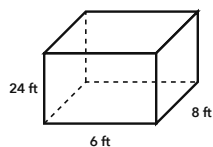
- 2** A 20 ft by 21 ft dance floor needs a diagonal LED strip. How many feet of strip are needed?

WORK SPACE

ANSWER _____

CHALLENGE One step up

The equipment case shown is rectangular. A strap runs from one bottom corner to the opposite top corner. Find the strap length. Show two Pythagorean steps.



WORK SPACE AND ANSWER

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	A stage crew uses a 7 ft ground brace and a 24 ft upright support. Find the brace length needed to reach the top.	25 ft
2	Three drone landing pads are 9 m, 40 m, and 41 m apart. Do the pads form a right triangle? Show a square check.	Yes. $9^2 + 40^2 = 41^2$.
3	A theater backdrop has side lengths of 10 yd, 24 yd, and 26 yd. Is the backdrop a right triangle? Show a square check.	Yes. $10^2 + 24^2 = 26^2$.
4	A bike designer makes a triangular frame with perpendicular sides of 11 cm and 60 cm. Find the straight support length.	61 cm

PART 2 • APPLY IT

1. **10 map units** The horizontal and vertical changes are 6 and 8. Use $6^2 + 8^2 = 100$, so the distance is 10.
2. **29 ft** Treat the floor sides as the legs of a right triangle. The diagonal is $\sqrt{20^2 + 21^2} = \sqrt{841} = 29$.

CHALLENGE

26 ft. First, the base diagonal is $\sqrt{6^2 + 8^2} = 10$ ft. Then the strap is $\sqrt{10^2 + 24^2} = 26$ ft.

Accept equivalent Pythagorean equations and correct square checks for the right-triangle questions. For the challenge, accept a correct two-step solution that finds 10 ft before 26 ft.